

# VIABILITY OF BIOGAS FROM SPENT LITTER

## CLARIFYING BIOMETHANE AND SMALL SCALE BIOGAS OPTIONS FOR AUSTRALIAN PIGGERIES

Recently, APL finished a hypothetical case study based on a real 535 sow farrow to finish piggery with grower-finisher pigs on deep litter. Biogas is proposed to be generated from breeder unit effluent, and from the spent grower litter (in an in-ground digester).

AUSTRALIAN  
**Pork**

### What is it

Biogas is a renewable source of energy that can be produced from organic matter. In our industry, this is mainly piggery effluent but this scenario explores generation of biogas from spent litter.

Spent litter is unsuitable for use in the covered anaerobic ponds used for 'traditional' biogas, because it has the potential to float, mix unevenly, and cause blockages in pipes and pumps. However, an in-ground digester is a viable option.

### How it works

Spent litter from growers is collected in an in-ground digester and combined with wastewater (leachate) to produce:

- Gas:
  - Biogas
  - By-product gases (dangerous)
- Digested litter residue

### Benefits

Biogas can be used on farms to generate electricity and therefore reduce running costs. The capture and use of biogas also provides two additional benefits to piggeries; 1) provides an alternative spent litter disposal option 2) that methane (one of the main components of biogas) is captured and used rather than released into the atmosphere where it has a damaging effect on the environment.

### Scenario assumptions

#### Spent bedding:

- Moisture content of 40%
- 382 dry tonnes per year
- Spent bedding is wheat straw (NOT rice husk or sawdust, as these would not produce enough biogas to be viable)

#### In-ground digester:

- For these quantities, volume was 880m<sup>3</sup>

**Capital Cost: \$625,520** (including cost of excavator)  
**Operating Cost: \$27,004**  
**Payback: 7.1 -10 years** depending on finance  
**Annual Benefit (using biogas for energy): \$105,170**

Total digestion of a batch of litter is expected to be ~25 weeks

1. In-ground, lined dam is filled with spent piggery litter
2. Dam is covered with a retractable, impermeable plastic cover to capture biogas
3. Waste water (leachate) is pumped from onsite effluent dams into the in-ground digester to fully flood the spent litter (this initiates the conversion to biogas)
4. Leachate is periodically pumped out to the existing covered effluent pond via a sump in the base of the digester and then 'new' leachate is pumped back in (as per 3)
5. When biogas production has declined due to fully digested litter, the cover is retracted and the digested litter residue is emptied out
6. The process repeats (from step 1)



**Safety warning:** to prevent a serious work health safety risk in the form of dangerous by-product gases, digestion of litter would be continued until biogas production had declined, then would be opened carefully away from people, and left open to allow airing out before the digested litter residue was removed.

